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EXPLOSIVE-MAGNETIC GENERATOR(U)
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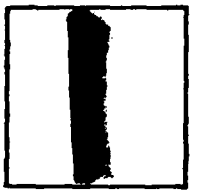

INVENTORY

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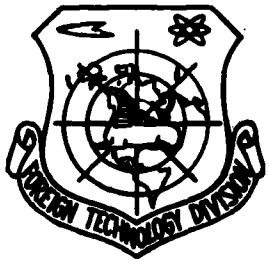
EXPLOSIVE-MAGNETIC GENERATOR

by

A. I. Pavlovskiy, R. Z. Lyudayev, et al.



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EXPLOSIVE-MAGNETIC GENERATOR

By: A. I. Pavlovskiy, R. Z. Lyudayev, et al.

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U. S. BOARD ON GEOGRAPHIC NAMES TRANSLITERATION SYSTEM

Block	Italic	Transliteration	Block	Italic	Transliterati
А а	*А а*	A, a	Р р	*Р р*	R, r
Б б	*Б б*	B, b	С с	*С с*	S, s
В в	*В в*	V, v	Т т	*Т т*	T, t
Г г	*Г г*	G, g	У у	*У у*	U, u
Д д	*Д д*	D, d	Ф ф	*Ф ф*	F, f
Е е	*Е е*	Ye, ye; E, e*	Х х	*Х х*	Kh, kh
Ж ж	*Ж ж*	Zh, zh	Ц ц	*Ц ц*	Ts, ts
З з	*З з*	Z, z	Ч ч	*Ч ч*	Ch, ch
И и	*И и*	I, i	Ш ш	*Ш ш*	Sh, sh
Й й	*Й й*	Y, y	Щ щ	*Щ щ*	Shch, shch
К к	*К к*	K, k	Ъ ъ	*Ъ ъ*	"
Л л	*Л л*	L, l	Ы ы	*Ы ы*	Y, y
М м	*М м*	M, m	Ь ь	*Ь ь*	'
Н н	*Н н*	N, n	Э э	*Э э*	E, e
О о	*О о*	O, o	Ю ю	*Ю ю*	Yu, yu
П п	*П п*	P, p	Я я	*Я я*	Ya, ya

*ye initially, after vowels, and after ъ, ь; e elsewhere.
When written as ё in Russian, transliterate as yё or ё.

RUSSIAN AND ENGLISH TRIGONOMETRIC FUNCTIONS

Russian	English	Russian	English	Russian	English
sin	sin	sh	sinh	arc sh	$\sinh^{-1}$
cos	cos	ch	cosh	arc ch	$\cosh^{-1}$
tg	tan	th	tanh	arc th	$\tanh^{-1}$
ctg	cot	cth	coth	arc cth	$\coth^{-1}$
sec	sec	sch	sech	arc sch	sech^{-1}
cosec	csc	csch	csch	arc csch	csch^{-1}

Russian	English
rot	curl
lg	log

1187

EXPLOSIVE-MAGNETIC GENERATOR

A. I. Pavlovskiy, R. Z. Lyudayev, L., N. Plyashkevich, and V. Ye. Gurin

The invention pertains to devices for obtaining powerful brief current pulses, in particular to generators of a special type in whose output circuit a pulsed electromotive force is induced as a result of a change in the magnetic flux which encompasses the output circuit and which occurs with the explosive deformation of the generator's primary circuit. Such devices are usually called explosion-magnetic generators (VMG).

In a number of cases where electrical energy is used, a gain of considerable power for a short period of time is required from the source. Traditional methods for obtaining a pulse of electrical

energy of tens and hundreds of kilo-Joules with a duration on the order of several units or dozens of microseconds is reduced to the employment of massive and awkward capacitor banks. The large dimensions and weight of such systems which cause their substantial fixed nature and high cost as well as the transient processes which inevitably accompany an increase in dimension and a complication in electrical connections are serious shortcomings which hamper the employment of traditional methods in an entire series of areas for the use of powerful electrical pulses.

As an alternative for traditional methods, recently methods have been developed for the generation of electrical pulses which are induced in the conducting output circuit of the generator as a result of a change in the magnetic flux which permeates this circuit during the explosion deformation of a closed primary conducting circuit which encompasses the magnetic flux which is initially created by some method and which capture this flux during its deformation. The use of chemical sources of energy such as explosives along with an electrical source which serves to create the initial magnetic flux permits us to create economical generators of powerful electrical pulses which have considerably smaller dimensions and weight per unit of output power. The simplicity and compactness of these generators are completely compensated by the necessity to restore the explosive unit of the generator after each operating cycle.

VMG 's can be employed in all fields of electrical engineering and physical studies where powerful heavy-current electrical pulses whose repetition time does not play a substantial role are required.

Existing VMG's have limitations on the value of the resistive load and the time for energy transmission. The inclusion of an active load in the output circuit of the generator is equivalent to increasing the internal resistance of the generator which reduces the magnetic-flux maintenance coefficient and lowers the effectiveness of the explosive's energy conversion to electrical energy. Furthermore, the time for the increase of the current in the load cannot be made less than the operating time of the generator without losses and this substantially limits its field of application.

The purpose of the invention is to reduce the time of current build-up in the load and reduce the effect of the load on the operation of the generators as well as to simplify the design of the generator. This is achieved by introducing into the circuit which connects the load with the output circuit of the generator a commutating device - an explosive contactor which closes the secondary circuit of the load only at the last stages of the deformation process of the generator's primary circuit.

The contactor consists of a rod and disk which are insulated from one another and which have been inserted into a central cylindrical tube which is part of the generator's primary circuit and is filled with explosive from a direction which is opposite to the direction in which the detonator is located.

A longitudinal cross section of the proposed explosion-magnetic generator is presented in the drawing.

The primary circuit of the generator consists of a copper spiral 1, toroidal electrical conducting surface 2 which is the primary winding of the transformer connecting the primary circuit with the load circuit, and a conical part 3 and central tube 4 with the explosive charge 5 located within it. The secondary winding 6 of the transformer is wound with cable, one end of which is short-circuited while the other is connected through disks 7, 8, and 9 with the load. Disk 9 is separated from part 3 by an insulator 10. A rod 11 soldered into the disk 9 is separated from a copper disk 12 which is pressed into the tube 4 by a thin insulation strip 13, desirably polyethylene. The capacitor bank 14 and controllable discharger 15 comprise a circuit which provides the initial magnetic field in the primary circuit of the generator.

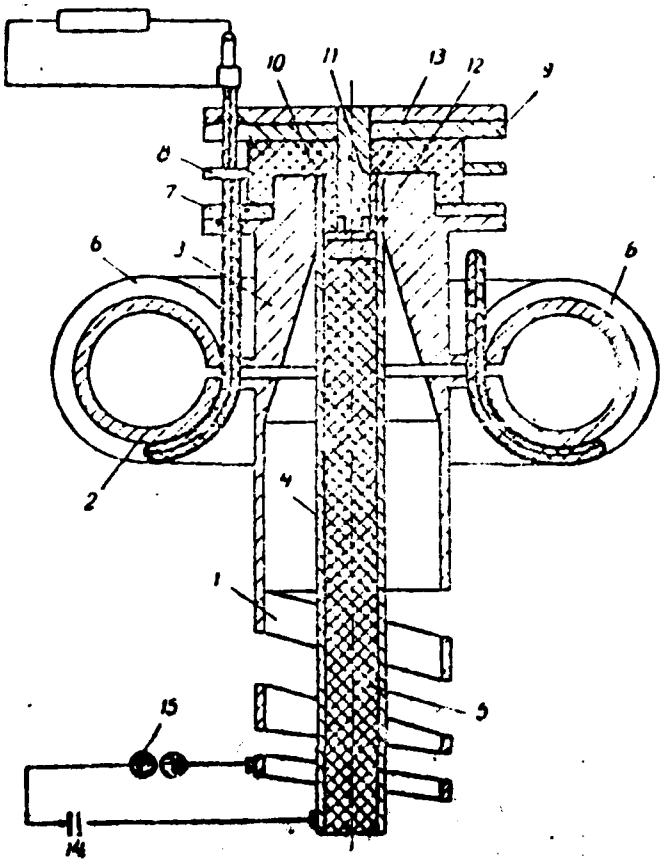
When the VMG operates, a magnetic field is created in its primary circuit and then the ignition and explosion of the explosive occur. The successive deformation of the primary circuit and compression of the magnetic field which is captured by it occur. Accordingly, at this time the increasing magnetic field penetrates freely into the open circuit of the load, more exactly into the secondary winding of the transformer which pertains to this circuit. At the end of the explosion process the magnetic energy proves to be virtually completely concentrated inside the toroidal surface. When the front of the detonation wave reaches the disk 12, the strip 13 is punctured and the secondary circuit is closed. The moment of closing can be regulated by varying the length of the rod 11. Beginning with the moment of closing, a reduction of the current in the primary circuit leads to the induction of an electromotive force in the secondary winding of the transformer and to the excitation of current through the load.

Subject of Invention

1. An explosion-magnetic generator which contains a primary

closed electrical conducting circuit, load circuit which is connected with the primary circuit, a circuit which provides the initial magnetic flux which is captured by the primary circuit, and means for the explosive deformation of this circuit which ensure the compression of the magnetic flux captured by the circuit which is distinguished by the fact that, to reduce the time for current build-up in the load and lower the effect of the load on the operation of the generator, the load circuit contains a normally open explosive contactor which is connected with the means for explosive deformation of the primary circuit and the closing circuit of the load at the last stages of the generator's operation under the effect of the explosion's products.

2. In accordance with paragraph 1, the device is distinguished by the fact that to simplify the construction of the generator, the contactor consists of a rod and disk which are insulated from one another and are inserted into a central cylindrical tube which is part of the primary circuit of the generator and filled with explosives from the direction which is opposite to the side in which the detonator is located.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